Duplex ASFV Fast qPCR Kit

Kit contents

Component	Cat. no. E0473-01 24 reactions of 25 µl	Cat. no. E0473-02 96 reactions 25 µl
Duplex ASFV Fast Master Mix	1 x 480 µl	4 x 480 µl
PC — positive control black cap	1 x 40 µl	1 x 150 µl
NC — negative control clear cap	1 x 40 µl	1 x 150 µl

Storage:

The kit should be stored in the dark at −20° C. Avoid repeated thawing and freezeing (>2x), due to possible reduced sensitivity.

Description

- Duplex ASFV Fast qPCR Kit is intended for the detection of DNA from African swine fever virus (ASFV) in blood, serum, plasma, swab samples (from mouth, nose, nasopharynx), tissues and organs of pigs and wild boars.
- The high sensitivity of the kit allows the detection of the ASF virus in both single samples and mixed (pooled) samples consisting of a maximum of 5 individual samples.
- Duplex ASFV Fast qPCR Kit allows to use a standard or fast PCR amplification program, depending on the user's preferences and the type of real-time PCR device used.
- The kit contains specific primers for the highly conserved ASFV p72 gene fragment. The amplified p72 gene fragment is detected using a probe labeled with FAM dye.
- Additionally, the kit contains an endogenous internal control consisting of primers and a probe labeled with HEX dye for a fragment of the porcine ACTB gene encoding beta-actin. Internal control allows both extraction and amplification to be monitored.
- DNA used for PCR-based diagnostics should be of good quality and purified using dedicated, commercial kits using silica or magnetic bead technology.
- Duplex ASFV Fast Master Mix contains all of the necessary reagents, including Perpetual Taq DNA polymerase, reaction buffer, deoxynucletide triphosphates (dNTPs), primers and probes combination and passive reference dye (ROX).
- Perpetual Taq DNA Polymerase is a modified "hot start" enzyme that is blocked at moderate temperatures by antibodies and allows room temperature reaction setup. The polymerase activity is restored during the initial 2-minutes denaturation step.
- The passive ROX reference dye included in the master mix enables fluorescence normalization in particular cyclers. The use of ROX dye is required for all Applied Biosystems real-time PCR cyclers and optional for Agilent cyclers. ROX compensates for differences in fluorescence signal between wells caused by small differences in reaction volume and fluorescence fluctuations. ROX is not involved in the PCR reaction and does not interfere with real-time PCR on any instrument.
- Positive control - PC contains both DNA fragment ASF virus and the porcine ACTB gene and serves to prove of the kit's operation, including the correct preparation of the PCR reaction. The fluorescence signal for ASF virus DNA in the FAM channel has CT= 29±2, and for the ACTB gene in the HEX channel has CT= 29±2.
- A complementary product to the Duplex ASFV Fast qPCR Kit (which can be ordered additionally) is the ASFV Positive Extraction Control (cat. no. E0474). The ASFV Positive Extraction Control is a reference solution containing a synthetic DNA fragment of the ASF virus and a synthetic fragment of the porcine ACTB gene and can be used as a positive control for the isolation of the ASF virus.

Equipment and reagents to be supplied by user

1. Pipets
2. Sterile pipet tips with filters
3. Sterile 1.5 ml tubes
4. PCR tubes, strip tubes or 96-well optical microplates
5. Lab coat, disposable gloves, protective goggles
6. Centrifuge with rotor for 1.5 ml tubes
7. Centrifuge with rotor/adapter for 96-well microplates
8. PCR cooler, mini lab cooler or ice
9. Real-time PCR cycler

Procedure

Preparation of PCR reaction:

Component	Negative Control 1 reaction	DNA Sample 1 reaction	Positive Control 1 reaction	Final concentration
Duplex ASFV Fast Master Mix	20 µl	20 µl	20 µl	1 x
PC—positive control	-	-	5 µl	
NC—negative control	5 µl	-	-	
Purified DNA sample	-	5 µl	-	
Volume	25 µl	25 µl	25 µl	

Notes:

1. A reaction volume of 25 µl should be used with most real-time cyclers. Other reaction volumes may be used if recommended for a specific instrument.
2. Thaw, gently vortex and briefly centrifuge all solutions. Keep the kit components on ice. Avoid multiple thawing and freezing (> 2x) of Duplex ASFV Fast Master Mix, as this may reduce the sensitivity.
3. Set up PCR reactions at room temperature. Use Duplex ASFV Fast Master Mix allows room temperature reaction setup.
4. Dispense 20 µl into PCR tubes or plates.
5. Add 5 µl of NC- negative control, 5 µl of the sample DNA or 5 µl PC-positive control to the individual PCR tubes or wells containing the reaction mix.
6. For every PCR run prepare at least 2 additional reactions: negative and positive controls. Due to the possibility of contamination, prepare the Negative Control first and the Positive Control last.
7. Centrifuge briefly to settle down the reaction components and remove bubbles. Bubbles interfere with fluorescent detection.
8. Place the samples in the cycler and start the program prepared according to the table below.

Real-time PCR Protocol:

Step	Standard mode	Fast mode	Number of cycles
Initial denaturation	95°C 2 min	95°C 2 min	1
Denaturation	95°C 15 s	95°C 10 s	40
Annealing/Extention	60°C 60 s	60°C 30 s	

Notes:

1. Run PCR reactions using standard ramp rate (standard mode) or fast mode depending on the user's preferences and the type of real-time PCR device used.
2. During the initial denaturation step Perpetual Taq DNA Polymerase is activated. Polymerase requires 2 min incubation at 95°C to restore activity.
3. Fluorescence analysis in the FAM and HEX channels should be performed by the device at the end of the extension step. ASF virus DNA is detected in the FAM channel and porcine beta-actin gene DNA is detected in the HEX channel.

Data Analysis and Interpretation:

Sample type	FAM channel	HEX channel	Sample result
Negative control	-	-	correct
Positive control	+	+	correct
Sample 1	-	+	negative ($ASFV^-$)
Sample 2	+	+	positive ($ASFV^+$)
Sample 3	+	-	positive ($ASFV^+$)
Sample 4	-	-	incorrect

Notes:

1. For the assay to be valid the positive control must give a signal in both the FAM and HEX channels. The Negative Control must give no signal
2. The sample is positive for ASFV and the assay is valid if:
   - the cryteria in the first point are met,
   - the sample yields a signal in both the FAM and the HEX channels.

   Exceptionally very high concentrations of ASFV DNA in the sample may lead to a reduced HEX signal or no HEX signal at all due to the competition with the internal control.
3. The sample is negative for ASFV and the assay is valid if:
   - the cryteria in the first point are met,
   - the sample yields a signal in only the HEX channel.
4. A positive HEX signal for the sample means that the DNA extraction and amplification were successful. High CT values (>35) for internal control may indicate partial PCR reaction inhibition. In turn lack of a signal at all in the HEX and FAM channel simultaneously may indicate complete PCR reaction inhibition or that no DNA was added to the test sample. In this case it is recommended to dilute 10 times the sample DNA or repeat the DNA extraction and run the PCR reaction again.
5. Absence of a signal for the positive control indicates to an error, which could be due to incorrect setup of the PCR reaction.